

**ABSTRACT**

[000119] An apparatus and method for inverting a 4x4 source matrix are described. A source matrix is initially divided into four 2x2 sub-matrices. Once sub-divided, a plurality of sub-matrix products are calculated from the sub-matrices. Next, a determinant of the source matrix is calculated to form a determinant residue utilizing one or more of the previously computed sub-matrix products. Calculation of partial inverse for each sub-matrix is next performed, using one or more of the sub-matrix products and determinants of the sub-matrices. Finally, an inverse of each sub-matrix is calculated, utilizing the partial inverse sub-matrices and the determinant residue to form an inverse of the 4x4 source matrix. The method allows processors to store two floating-point elements within a SIMD register. Accordingly, a sub-matrix is represented using two SIMD registers, resulting in improved computational locality and efficiency in comparison to the standard methods, thereby improving performance for matrix inversion operations.

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